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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BUEKER, RICHARD R

ART UNIT PAPER NUMBER

1763

DATE MAILED: 10/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/720,989

Applicant(s)

HOFFMANN ET AL.

Examiner

Richard Bueker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>5/10/04</u> . | 6) <input type="checkbox"/> Other: _____ |

Claims 14-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 14, line 8, the phrase "a horizontal vapor outlet defined by a plurality of holes therein the lateral surface" is unclear because the word "therein" is used non-idiomatically. It is unclear if "therein" refers back to "a horizontal vapor outlet", and it is unclear if the above quoted phrase requires the recited "plurality of holes" to be in the recited "lateral surface" or not. It is suggested that "therein" be changed to "in".

Claims 14, 15, 19, 20, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witzman (6,202,591) in view of Nakabayashi (JP 2001 192293) and Baxter (5,803,976). Witzman's Fig. 14A vapor source (see col. 15, lines 24-38) includes a crucible with a nozzle pipe (chimney) mounted on top of the crucible. The nozzle pipe deflects vapor from the crucible into a horizontal direction and delivers the vapor to a vertically aligned substrate. Regarding the construction of Witzman's vapor source, Witzman teaches (see Figs. 3A, and col. 8, lines 1-35, for example) that a nozzle pipe chimney distributor can successfully be attached to a crucible by placing it from above so that it forms a seal on the top of the crucible. It would have been obvious to one skilled in the art to mount the chimney of Witzman's Fig. 14A in the manner described by Witzman at col. 8, lines 1-35. Regarding claim 20, the flow restricting baffle 474 of Fig. 14A of Witzman includes holes that meet the claim 20 limitation of a nozzle pipe vapor outlet formed by multiple holes positioned one over another. Witzman (Figs. 1A and 3A) teaches the step of providing heat reflectors such as molybdenum heat shield

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86 of Fig. 3A around a vapor source. The heat reflector is enclosed in a water-cooled copper vaporizer housing 90 that is cooled by cooling pipes 92. Fig. 3A of Witzman shows that the reflector and cooled housing are arranged around the heated nozzle pipe chimney 66 to properly maintain the temperature of the heated nozzle pipe. Nakabayashi (Figs. 5 and 8) also teaches the use of a reflector and cooled housing around a nozzle pipe chimney for improved thermal control. The nozzle pipe of Witzman's Fig. 14A is heated to a high temperature in the same manner as the nozzle pipe of Fig. 3A, and it would have been obvious to one skilled in the art to provide it with the same type of thermal shield as in Fig. 3A of Witzman or Nakabayashi. Baxter also teaches the use of plural reflectors and a cooled housing (see Figs. 3 and 4). Baxter also teaches the use of a nozzle pipe having horizontally oriented vapor outlet openings (Fig. 5), and one skilled in the art would have recognized that Baxter intended for the embodiment of Fig. 5 to also be provided with reflectors and a cooled housing as in Figs. 3 and 4. From these teachings of Baxter, it also would have been obvious to provide the nozzle pipe of the embodiment of 14A of Witzman with reflectors and a cooled housing.

Regarding claims 22 and 24, it is noted that the particular temperatures used and the particular materials melted in the claimed apparatus are process limitations that are in effect recitations of intended use of the claimed apparatus, and the claimed apparatus is not so limited.

Regarding claim 15, Nakabayashi (see Fig. 8 and page 11, lines 3-20) discloses a vapor source having a crucible with a nozzle pipe located thereon. A separate heater

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is provided for each of the crucible and the nozzle pipe. The heaters are provided for the same purpose as the heaters of Witzman. The crucible heater vaporizes the coating material, and the nozzle pipe heater prevents condensation of the coating vapor with the nozzle pipe. Nakabayashi teaches that it is desirable to provide a first thermocouple to control the crucible heater, and a second thermocouple to control the nozzle pipe heater. It would have been obvious to one skilled in the art to provide the Fig. 14A vapor source of Witzman with separate heaters and separate thermocouples to desirably improve the temperature control of the vapor source.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witzman (6,202,591) in view of Nakabayashi (JP 2001 192293) and Baxter (5,803,976) for the reasons stated in the rejection of claims 14, 15, 19, 20, 22 and 24 above, and taken in further view of Goldstein (5,321,260). Goldstein teaches (see the Fig. and col. 4, lines 25-27) the use of a tapered diameter joint to connect a crucible with a nozzle pipe. It would have been obvious to one skilled in the art to use a diameter taper to connect the chimney and crucible of Witzman because Goldstein teaches that a seal of sufficient degree can be successfully formed between a crucible and nozzle pipe using a tapered diameter joint.

Claims 17, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witzman (6,202,591) in view of Nakabayashi (JP 2001 192293) and Baxter (5,803,976) for the reasons stated in the rejection of claims 14, 15, 19, 20, 22 and 24 above, and taken in further view of Makino (3,417,733) and Roblin (3,672,327). Makino (Figs. 1-3) discloses a vapor source having a nozzle pipe 1, which has nozzle holes on

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its side to direct vapor laterally onto vertically aligned substrate surfaces to be coated. Makino teaches (col. 3, lines 46-75 and col. 4, lines 60-64) that it is desirable to provide a truncated cone shape (see element 2 of Figs. 1-3) having a coaxial filling opening at the top of the nozzle pipe. It would have been obvious to one skilled in the art to provide such a fill opening in the top of Witzman's nozzle pipe in the manner taught by Makino, to provide greater convenience of filling vaporizable material into the vapor source. Regarding the claimed truncated cone shape, Makino teaches that this shape can successfully be used, and it is considered prima facie obvious to use this shape in Witzman's vapor source, at least to the extent presently claimed. Makino intends his filling opening to be closed (col. 4, lines 60-64) by some closure element, but does not discuss what type of closure element he uses to close his inlet hole 2. Roblin (see Figs. 3 and 4) also discloses a vaporizer in which a fill plug 50 (see Fig. 4 and col. 5, line 70 to col. 6, line 6) is used to close fill ports. The closure element 50 of Roblin is a "sealing mechanism" as recited in claim 1 as amended. It would have been obvious to provide the fill hole of Makino with a closure plug as taught by Roblin. Regarding claim 17, It is noted that "plunger" is defined as "a person or thing that plunges", while "plunge" is defined as to cast or thrust forcibly or suddenly into something". A fill plug includes a plug portion that thrusts into a fill port by force, and therefore can properly be considered to be a plunger. Regarding claim 21, Roblin teaches that graphite is a refractory material that can usefully be used to construct melting crucibles and nozzle pipes, and it therefore would have been obvious to use this material for the crucible and nozzle pipe of Witzman.

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Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witzman (6,202,591) in view of Nakabayashi (JP 2001 192293) and Baxter (5,803,976) for the reasons stated in the rejection of claims 14, 15, 19, 20, 22 and 24 above, taken in further view of Ingram (5,740,858) (see Fig. 1, for example), who teaches the use of a cooling pipe having a serpentine or meander shape for uniformly cooling a surface. This is a common and well-known shape for cooling pipes when uniform cooling of an extended area is desired. It would have been prima facie obvious to use this shape on a nozzle pipe housing to uniformly cool the housing. It is noted again that Nakabayashi teaches the desirability of providing a cooled housing around a nozzle pipe.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witzman (6,202,591) in view of Nakabayashi (JP 2001 192293) and Baxter (5,803,976) for the reasons stated in the rejection of claims 14, 15, 19, 20, 22 and 24 above, and taken in further view of Ney (4,412,508) (abstract) or Mattord (6,011,904) (col. 3, lines 10-17) or Roblin (3,672,327), who all teach that graphite can successfully be used as a refractory material of construction for a crucible and nozzle pipe of a vapor source. It would have been obvious to one skilled in the art to utilize graphite as the refractory material of construction of Witzman because the secondary references teach that graphite can successfully be used as a vapor source material of construction.

Claims 14, 17 and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roblin (3,672,327) taken in view of Witzman (6,202,591) and Baxter (5,803,976) and in further view of Cole (3,690,933). Roblin (see Figs. 3 and 4 for example) discloses a device for vapor deposition of vertically aligned regions of a

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substrate comprising a melting crucible having a crucible heater and an elongate nozzle pipe comprising parts 46' and 56' of Fig. 4. It is noted that pipe 56' is supported directly by pipe 46' (see col. 5, lines 67-70 of Roblin). A pipe heater (86 of Fig. 4) which is independent of the crucible heater is included. A sealing mechanism (50' or 32') is positioned above a coaxial filling opening. In Roblin's design, the nozzle pipe would inherently or obviously be "placed from above the melting crucible". Also, the nozzle pipe of Roblin comprises a taper shaped like a truncated cone on its upper end as recited in claim 4 (see pipe 56' of Fig. 4 of Roblin). Roblin teaches that his heated vaporizer crucible and nozzle should be surrounded by heat insulation, but does not discuss details such as using plural concentric reflectors and a cooled outer housing. Baxter (see Figs. 3, 4 and 5, for example) and Witzman (Figs. 1A and 3a, for example) teach that it is desirable to provide plural reflectors and also a cooled outer housing around a heated vaporizer crucible, for protecting the substrate and other parts of the vacuum chamber from excess heat from the heater vaporizer. It would have been obvious to one skilled in the art to provide the heated vaporizer and nozzle pipe of Roblin with heat reflectors and a cooled housing as taught by Witzman and Baxter for the desirable purpose of preventing the heated vaporizer apparatus from radiating excess heat to its surroundings. Also, Cole is cited for his teaching at col. 3, lines 10-118, that resistive heating rods (such as resistive heating rods 82 of Witzman – see col. 8, line 24 of Witzman) were known in the prior art as a functional equivalent to the heater tubes enclosing burning gas disclosed by Roblin (see heater pipes 60 of Fig. 3 of Roblin, for example). Therefore, it would have been obvious to modify the apparatus of

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Roblin by providing it with the type of crucible heater used by Witzman. Regarding the multiple holes recited in claims 9 and 14-24, it is noted that Witzman and Baxter both teach that it is desirable to provide multiple holes in a vapor discharge nozzle to uniformly coat a wide substrate. Therefore, it would have been obvious to provide the discharge nozzle of Roblin with plural holes to adapt it for uniformly coating a wide substrate.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roblin (3,672,327) in view of Witzman (6,202,591), Baxter (5,803,976) and Cole (3,690,933) for the reasons stated in the rejection of claims 14, 17 and 19-24 above, and taken in further view of Nakabayashi (JP 2001 192293). Nakabayashi (see Fig. 8 and page 11, lines 3-20) discloses a vapor source having a crucible with a nozzle pipe located thereon. A separate heater is provided for each of the crucible and the nozzle pipe. The heaters are provided for the same purpose as the heaters of Roblin. The crucible heater vaporizes the coating material, and the nozzle pipe heater prevents condensation of the coating vapor with the nozzle pipe. Nakabayashi teaches that it is desirable to provide a first thermocouple to control the crucible heater, and a second thermocouple to control the nozzle pipe heater. It would have been obvious to one skilled in the art to provide the Fig. 14A vapor source of Roblin with separate heaters and separate thermocouples.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roblin (3,672,327) in view of Witzman (6,202,591), Baxter (5,803,976) and Cole (3,690,933) for the reasons stated in the rejection of claims 14, 17 and 19-24 above, and taken in

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further view of Goldstein (5,321,260). Goldstein teaches (see the Fig. and col. 4, lines 25-27) the use of a tapered diameter joint to connect a crucible with a nozzle pipe. It would have been obvious to one skilled in the art to use a diameter taper to connect the nozzle pipe 46' of Roblin to the crucible 42' because Goldstein teaches that a seal of sufficient degree can be successfully formed between a crucible and nozzle pipe using a tapered diameter joint.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roblin (3,672,327) taken in view of Witzman (6,202,591), Baxter (5,803,976) and Cole (3,690,933) for the reasons stated in the rejection of claims 14, 17 and 19-24 above, taken in further view of Ingram (5,740,858) (see Fig. 1, for example), who teaches the use of a cooling pipe having a serpentine or meander shape for uniformly cooling a surface. This is a common and well-known shape for cooling pipes when uniform cooling of an extended area is desired. It would have been prima facie obvious to use this shape on a nozzle pipe housing to uniformly cool the housing.

The Remondiere (4,880,960) reference has been removed to simplify the stated rejections. The teachings of Remondiere regarding the use of plural heat reflectors is duplicated by the teachings of Baxter with respect to Baxter's plural heat reflectors 38 of Figs. 3 and 4.

Applicants have argued that Nakabayashi does not have a side opening, but instead has an end opening. It is noted, however, that Nakabayashi's opening can correctly be described as being on a side of the nozzle pipe.

Applicants have argued that the teachings of the cited references cannot be combined because the resultant apparatus would be inoperable. It is noted, however, that "the test for obviousness is not whether the features of a secondary reference can be bodily incorporated into the structure of the primary reference . . . Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 208 USPQ 871. See also *In re Sneed*, 218 USPQ 385 and *In re Nievelt*, 179 USPQ 224. In the present case, the teachings of Witzman, Nakabayashi and Baxter considered together would have suggested to one skilled in the art the desirability of providing heat reflectors for enclosing the heated nozzle pipe of Witzman and a housing with cooling pipes for enclosing the heat reflectors.

Applicants have argued that none of the cited references teach a vaporizer housing comprising "a plurality of exterior cooling pipes extending substantially the elongate length of the nozzle pipe". It is noted, however, that all three of Witzman (see Fig. 3A), Nakabayashi (see Fig. 5) and Baxter (see Figs. 3, 4 and 5) the use of a vaporizer housing comprising cooling pipes extending along the length of a nozzle pipe, and in the elongate direction. Also, Witzman (see col. 8, lines 31-35) teaches that the purpose of providing cooling pipes on the vaporizer housing is for "substantially preventing excess heating of substrate 72 and other parts of the vacuum chamber". This teaching provides the motivation for one skilled in the art to provide a cooled housing to enclose those portions of the vapor source that would otherwise cause excess heating of the substrate to be coated, or excess heating of other parts of the vacuum chamber.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

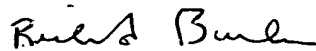
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard Bueker
Primary Examiner
Art Unit 1763